RECORD OF ORAL HEARING

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHARILAOS CHRISTOPOULOS and
ATHANASIOS SKODRAS

Appeal 2007-2758
Application 09/394,428
Technology Center 2600

Oral Hearing Held: November 8, 2007

Before HOWARD B. BLANKENSHIP, MAHSHID D. SAADAT, and ROBERT E. NAPPI, Administrative Patent Judges

ON BEHALF OF THE APPELLANTS:

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The above-entitled matter came on for hearing on Thursday, November 8, 2007, commencing at 9:20 a.m., at The U.S. Patent and Trademark Office, 600 Dulany Street, Alexandria, Virginia, before Jan Jablonsky, Notary Public.

JUDGE BLANKENSHIP: Good morning, Mr. Lastova.

MR. LASTOVA: Good morning.

JUDGE BLANKENSHIP: Judge Saadat is under doctor's orders at home, so she's on speaker phone and she can hear everything you say.

MR. LASTOVA: Good morning, Judge Saadat.

JUDGE SAADAT: Good morning. How are you today?

MR. LASTOVA: I'm doing quite well. A little brisk outside. That gets us all going.

Today's hearing relates to discrete cosine transforms. And that's a pretty sophisticated technology, but just to give a very brief overview, it's a technique for expressing a wave form as a weighted sum of cosines, rather than as a weighted sum of sines and cosines as you would have in a discrete fourier transform.

It's used in image processing to separate an image into spectral sub-bands of differing importance. And an advantage of DCTs over DFTs is that you only need to perform real multiplications, rather than complex multiplications; which simplifies some of the calculations. But still, it's a pretty complicated and computationally intense procedure to calculate them.

So the inventors recognized that there were situations -- say, for example, a video conference -- in which there might be different people in the video conference that have different qualities of services, different bandwidths, different abilities to receive certain amounts of data. And what they recognized was there needed to be a way for that party to still be participating. And what they also realized was that, while it's all well and good to be able to have a whole bank of DCTs of different sizes to provide

these different qualities of services, that again that could be pretty complicated, expensive, and so forth to do that.

So what they wanted to figure out -- and they did figure out -- was how do you handle this situation, and you could only really use one size DCT? Okay? How can you essentially come up with and calculate a larger size DCT, when you only have a smaller size DCT? All right, so that's the problem.

And that is the very solution that the inventors were able to come up with. Now, they give a pretty good example of how you can take an 8-by-8-size DCT and then come up with a 16-by-16-size DCT. They give a pretty good explanation of that, in terms of math.

I'll start on page 5, which I won't even attempt to go through here, because it's pretty sophisticated stuff. And Figure 5 is a little bit better illustration of showing what has to be done, because it takes some pretty clever mathematics to be able to pull this off. It's not a straightforward thing to do. But they were able to pull it off, and it ended up actually giving them a very efficient way to do this; but not having to have, as I said, a whole bank of different sized DCTs.

So the examiner's rejection is primarily based on this Lee patent, the Lee 345 patent. Now, Lee is a different kind of patent.

JUDGE NAPPI: Excuse me, counsel. Before you get into that, I just have kind of a preliminary question about Lee.

MR. LASTOVA: Yes.

JUDGE NAPPI: Looking at the prosecution history of this case --

MR. LASTOVA: Okay.

JUDGE NAPPI: -- we had a final rejection that had a 103.

MR. LASTOVA: Okay.

JUDGE NAPPI: You filed a brief. I'm asking you to just kind of go through it, because there's some question in my mind as to where things stand on this case procedurally. You filed a brief.

MR. LASTOVA: Yes, it's a very confusing file history, I have to say; partly, I think, because it got bounced back by the board here. I recall that the examiner had allowed some claims. So we have a first brief, right?

JUDGE NAPPI: Yes.

MR. LASTOVA: And that's a 103, right?

JUDGE NAPPI: Uh-huh.

MR. LASTOVA: We filed a brief arguing all the claims, essentially, right?

JUDGE NAPPI: Okay. We're dealing with the 103 in this case?

MR. LASTOVA: Well, actually, so then the examiner comes back, right, and makes what I believe was a 102, right, in the second, when he pulls back and allows some of the claims, right?

JUDGE NAPPI: And he just issues another non-final action?

MR. LASTOVA: He issues another non-final action. Now it's a 102.

JUDGE NAPPI: A 102 on Lee?

MR. LASTOVA: On Lee.

JUDGE NAPPI: That has to be briefed.

MR. LASTOVA: Right.

JUDGE NAPPI: And that's what you appealed.

MR. LASTOVA: Right.

JUDGE NAPPI: And then he gave you an examiner's answer addressing the 102.

MR. LASTOVA: Right.

JUDGE NAPPI: And then it got remanded, or returned.

MR. LASTOVA: Returned. It got returned to try to reframe Claim 11, because somehow one of the amendments didn't get turned in.

JUDGE NAPPI: Uh-huh.

MR. LASTOVA: And when I was looking at the case today, the best I could tell, the examiner forgot he had allowed some of the claims, forgot he had made a 102, and just sort of copied and pasted and went back to another rejection. But I still think what's on appeal before us today is the claims that were rejected under 102 based on Lee, a subset of the claims that were not allowed. That's my understanding.

JUDGE NAPPI: Are there any communications with the examiner clarifying that?

MR. LASTOVA: Well, I mean, I had a lot of telephone calls with him. I mean, so all I have is that. And I have the interview summary record here, where he basically said to me, "It's a total mess. We have to figure out how to do this. The easiest thing to do is to just go ahead, make this amendment"; and then he actually asked me to fax the claims on appeal. And you can see the response advisory action after filing of the appeal brief, dated November 5, 2005, in which I put the claims on appeal -- which, of course, are the claims that we're discussing today, just the ones that are rejected.

JUDGE NAPPI: Claim 11 is the only issue?

MR. LASTOVA: Pardon me?

JUDGE NAPPI: Claim 11 is the only issue, as far as which is the proper version.

MR. LASTOVA: Proper version, that's right.

JUDGE NAPPI: Okay. So we're today considering the claims that are rejected under 102 based upon the non-final action?

MR. LASTOVA: Right. The primary rejection is the 102 claims, I think two, 11, 14, 16, 19. And there is a 103 that the examiner, I believe, has still maintained, of 22 and 23 and 24. Okay?

JUDGE NAPPI: I just wanted to make sure that we're all on the same page, so that there is some clarity in the record.

MR. LASTOVA: I agree with you, and I think, because of the passage of time between when everything happened and when everything got bounced back from the board a couple of times and got resolved, and we, I think, tried to resolve it via telephone, when I think memories had dimmed a little bit on where we were. But I think that's where we're at right now.

And if we're not there, I want to address whatever claims you think are on appeal or not on appeal or finally rejected. Because at the end of the day, the claims that are allowed, or were allowed -- and I didn't see the examiner withdraw the allowance of those, okay? -- are even more patentable, if you will, because they have additional features in the claims than the claims currently on appeal. So please let me know if I'm misunderstanding. I'm going to proceed on that basis. Is that acceptable?

JUDGE NAPPI: That was what I was thinking, also. But I just wanted to see if you had any other insight into it.

MR. LASTOVA: Right. Again, Examiner Senfi was very friendly on the phone and was trying to resolve all of this. Again, I think years have passed, and so I think that's where we were.

All right, back to Lee. Now, Lee, if you look at Figure 1 of Lee, which I think is the most helpful figure that we can start with in Lee, Lee's approach is actually -- It's a great approach, if you want to drive a Cadillac or a Mercedes Benz.

He has a 16-by-16-pixel block that comes from the left there, and as you can see, looking from the top down, he has a bank of DCTs. He has a 2-by-2 DCT, a 4-by-4 DCT, an 8-by-8 DCT, a 16-by-16 DCT. Basically, he's got the horsepower, if you will, to do any one of those that he decides is the best one for him to do. All right? So he's trying to actually figure out what's the optimal block size -- not DCT size, block size -- for me to get the optimal result that he wants to get.

And so he goes through a bunch of techniques here to figure out what that's going to be here. And I'm going to quote for you just very briefly from column seven, starting at line 30, how he describes his adaptive block size DCT technique, all right? And he says that that technique is implemented in the present invention and may be simply described as a compare-and-replace scheme. A 16-by-16-pixel data array, or block of the image, is coated as in the fixed-block-size DCT techniques. However, sub-block sizes of 16-by-16, 8-by-8, 4-by-4, and 2-by-2 are used. Again, he says sub-block sizes; not DCT now, it's sub-block sizes.

He gives an example. For each 4-by-4 block, the number of bits to code the block by using four 2-by-2 sub-blocks inside the 4-by-4 block is examined. If the sum of the four 2-by-2 sub-blocks is smaller than the bits needed to code it as a 4-by-4 block, well, then the 4-by-4 block is replaced by the four 2-by-2 sub-blocks. Now, that's a mouthful. Okay?

But what the example is, is he's basically looking and saying, "Well, which one gives me the smaller number of bits that need to be coded?" That makes sense. And he's kind of figuring out, he says, "Well, okay, if I can do it with one 4-by-4, great. But if it's actually more optimal and fewer bits to do four 2-by-2's, well, I'll take that route and use it that way." So he's trying to figure out which one it is. And in each stage, he makes that decision about how he's going to go about doing that.

So the key that he's doing, he's trying to find, to use the language that the appeal claims, the optimal "N" size -- capital "N" -- trying to figure out, "What's the size that I want to use? Once I've figured out the size of the DCT that I'm going to actually use, then I'll go through that path, crank those through, and so forth." All right?

So he's essentially calculating a bank of "N"-sized DCTs, and he has to determine which one I want to use. All right? So you can see how computationally intensive it's going to be. You can see he's got 2-by-2s, 4-by-4s, 8-by-8s, and 16-by-16 DCTs that he's got to go through and work with.

Now, we only use one size DCT. All right? And I think that's the key. That's the reason why we're all here and it's important here today. I want to make sure there's no confusion, in the way the examiner got confused, between different sized pixel blocks or sub-blocks with different sized DCTs. And I want to make sure that I dispel this idea that I think the examiner tried to put into his answer where, "Well, if I can calculate a bunch of, let's say, 8-by-8 DCTs for a bunch of sub-blocks -- four of them, let's say -- and I later kind of just mix them up together, I kind of multiplex them

all together at the end, I effectively have calculated a 16-by-16 DCT," and that's just not accurate. Okay?

The examiner hasn't shown how that could be done. I talked with the inventor on this issue. He says that's just poppycock, to use his words; it can't be done that way. The burden is on the examiner, first, to prove that it could be done that way.

So what you end up seeing, then, is that when you look at, say, for example, claim two, you see that claim two requires first processing circuitry for calculating a discrete fourier transform of length "N"-over-2 by "N"-over-2; "N" being the positive even, to produce four sequences of coefficients. Those, of course, would be "N"-over-2 DCT coefficients. Okay? Not "N" coefficients, but "N"-over-2 DCT coefficients.

Then the second processing circuitry calculates a DCT of length "N" by "N" directly from the four sequences of the coefficients that were produced using the "N"-over-2 by "N"-over-2 DCT. All right? So that's what has to be done.

In Lee, we see that just is not done. Figure 1 and Figure 2 both show that at all times we have separate paths and each DCT is the size of the DCT, and it stays that size all the way through. Okay?

JUDGE NAPPI: Can you walk me through in your spec where we have the first processing circuitry and the second processing circuitry perform these functions?

MR. LASTOVA: All right, let's see --

JUDGE NAPPI: I'm trying to figure out how to interpret this claim, and I want to understand what you mean by a processing circuitry.

MR. LASTOVA: Well, I mean, in terms of the figures, or in terms of a detailed description?

JUDGE NAPPI: Either one.

MR. LASTOVA: Well, I'll give that a go. I hadn't prepared that for the hearing today, but let me just take a quick look here and see if we can get that through.

Well, we've got the flow charts, particularly the flow chart in Figure 2, which give examples of the processing steps, other examples of processing steps, right?

JUDGE NAPPI: That shows the process?

MR. LASTOVA: Right, shows the process. Obviously, it could be implemented using the computer or some kind of computing circuitry.

JUDGE NAPPI: So you're saying the processing circuitry is a computer? That's the program?

MR. LASTOVA: Right. It could be a computer program, yes. Now, to be honest with you, Judge, you've probably read the specifications more recently than I have. So I'm not sure exactly what they say in terms of the exact processing circuitry.

JUDGE NAPPI: It wasn't jumping out at me. That's why I was asking.

MR. LASTOVA: Right. And if that's something that you want me to file a supplemental paper on, I think that would be the better course of action, for me to do that.

I think at this point in time, I can see that there are discussions of memories, as I'm flipping through the spec, and I'm looking at it right now; the steps for executing an algorithm. So it's going to be some kind of data

processing circuitry that can execute an algorithm. And it's obviously stored using some sort of memory.

So I would say the best bet here now, without having read it recently, would be to suggest that it would be a program to a kind of computer, or perhaps some kind of program DSP that could perform these functions.

Would you like me to file a paper to follow up on this?

JUDGE NAPPI: No, I don't know if that will be necessary.

MR. LASTOVA: All right.

JUDGE NAPPI: We have you here, you know. The purpose of the hearings is to try to help us better understand the case.

MR. LASTOVA: Right.

JUDGE NAPPI: Are you familiar with the federal circuit's recent decision in Comiskey?

MR. LASTOVA: No, I'm not.

JUDGE NAPPI: It was a 101 issue.

MR. LASTOVA: Okay.

JUDGE NAPPI: And in looking at these claims, clearly, everything you've discussed so far today has been the algorithm --

MR. LASTOVA: Uh-huh.

JUDGE NAPPI: -- of transforming the discrete cosine transforms in various manners. Looking at claim two --

MR. LASTOVA: Uh-huh.

JUDGE NAPPI: -- or claim 11, which is the methods claim --

MR. LASTOVA: All right.

JUDGE NAPPI: -- what do you see that draws that claim to statutory subject matter?

MR. LASTOVA: Fair question. Let's look at claim two. Claim two is an encoder or decoder. In the context of the specification, we understand that's encoding or decoding for purposes of image processing. And so I'm going to fall back on saying, well, that's structure.

JUDGE NAPPI: No, it's the question of what a circuit is. That was where that question was coming from.

MR. LASTOVA: Uh-huh.

JUDGE NAPPI: What is the structure?

MR. LASTOVA: Right. So again, if it was a program computer, all right, for implementing the algorithm, the point is, it's still going to be encoding and decoding raw data, image data, for purposes of transmission.

JUDGE NAPPI: There's no transmission in that claim.

MR. LASTOVA: Right. But the point is an encoder or decoder would be understood as a device that's used in the context of transmitting, or a decoder receiving. We do have figures here. You see the conference call right there that's shown in Figure 1. You certainly have that. So there is a practical application.

JUDGE NAPPI: Yes. It would have to be a claimed practical application, is my understanding.

MR. LASTOVA: Right. So, well, I mean, I think the point here is you're asking about -- I'm saying the claim recites an encoder or decoder.

JUDGE NAPPI: Okay.

MR. LASTOVA: And so the encoder or the decoder certainly has to be understood as a device that is used in a useful context. All right? And the encoder or decoder is then going to use this circuitry inside the circuitry to accomplish that useful result.

Claim 11, if you read the beginning of that, says, "A method of encoding a digitalized image." So in other words, it's a method for using an encoder and so forth. Claim 19 relates to transcoding an image; claim 16, a method of decoding the image. So certainly, the application of this is quite practical. The structure, encoder or decoder, that's a relatively well known structure.

And since that's not a rejection on appeal, I would say, just looking at the claims, they seem statutory, at first blush, to me; given the fact that they are useful, they do recite structure, the structure is in the context of an application that is practical, of tangible applications. And the fact is that we can understand that computers, of course, digital program computers, DSPs that are programmed, I think those devices have been long claimed, as you all well know, and found to be statutory subject matter as well. So I guess we could come at this from a couple of different angles. But each angle that I'm looking at suggests that the claims are statutory.

JUDGE SAADAT: I have a comment, counsel. The way you describe this, these processing circuitries are nominal generic processes; or at least, related components. If that is the case, what distinguishes them over any type of processor that does sub-calculations?

MR. LASTOVA: Okay.

JUDGE SAADAT: I mean, if you put the emphasis on the generic processing circuitry, all those calculations just become regular sub kind of calculations. And if you put the emphasis on the process of calculating, then it becomes like sub-serve percentage.

MR. LASTOVA: Well, again, I mean, I was responding to Judge Nappi's comment with respect to the 101-type rejection. Obviously, I'm not

discounting that the circuitry has been configured in a particular way. I'm not suggesting we've invented an electronic circuit in the sense that we were the first time to ever come up with a DSP or program computer. The question is, how is the circuitry configured to perform certain functions as we've recited specifically here?

So that's my response to that, Judge Saadat. So I think that you have to read the claim in its full context. We're not just saying we claim an encoder with a first processing circuit and a second processing circuit. We've claimed an encoder or decoder that has that circuitry, and that circuitry is configured to perform very specific operations that transform data from one particular state to another state and, as I said, gives a useful result, which is the result that we can now calculate different size DCTs when we only have one DCT available. Does that answer your question?

JUDGE SAADAT: It does. That's the dilemma it creates. If we determine that these are statutory just because there is some encoding or decoding or processing circuitry involved, then what is specific about this processing circuitry? It either would make it statutory and probably just generic circuitry for doing sub-calculations, correct?

MR. LASTOVA: Well, okay, now the sum -- I think I kind of heard you say for some calculations. We're not claiming a generic device, in the sense that the device actually has to perform very specific calculations, right? It has to be able to calculate a DCT that's only got a certain length -- a 2-by-2, for example, all right? -- to produce four sequences of coefficients that relate to "N"-over-2 type DCT operations. That's one processing function that has to be performed.

And another one that has to be performed is to be able to calculate a DCT of length "N"-by-"N" correctly from these four sequences of coefficients. So I think we can't just look at one on one and say, "Well, you just claim the computer here; you just claim a generic circuit." I think that what we've invented here is an encoder or a decoder, looking at claim two, that can be used in the context of image processing to be able to provide to a transmitter that has to transmit this data in a compressed format using just one DCT size.

And I think that's really what's novel and useful -- frankly, quite useful -- particularly as I started off the hearing describing a video conference in which different people had different qualities of services and couldn't necessarily always handle the bandwidth that would be required for, say, for example, a 16-by-16 DCT type bandwidth.

So I think if we just focus on one thing, or one word, or one drawing, we lose the context of the overall application.

JUDGE SAADAT: So you are suggesting that the processing circuitry includes different components that have to produce these two sequences and then that are obtained from the length of "N"-over-2; and that another circuitry must store them and then process them to calculate the complete length "N"?

MR. LASTOVA: Yes. I mean, the circuitry has to be configured to do that.

JUDGE SAADAT: That's what Judge Nappi was asking the first time. We don't see a particular processing circuitry disclosed.

MR. LASTOVA: Right. And as I was trying to respond earlier to that, I think what we do see is we see function block diagrams. We see a

flow chart. We see flow charts in the figures. We see a discussion. And again, I haven't really looked at this particular issue in preparation for this appeal. But we certain can see that there is envisioned some kind of data processing circuitry and some kind of memory that would permit the computations to be performed as we've claimed them.

And I don't want to say here on the record, "Well, it has to be a DSP, or it has to be a program computer." Either one of those could be fine. It could potentially be implemented in an ASIC chip, which maybe in fact is the way they actually do it. So there are different ways that the circuitry could be implemented to implement these specific functions. So that's one thing I want to make sure is clear on the record.

JUDGE NAPPI: Well, what I'm also hearing you say is it's not actually two physical circuits. This is one chip that's performing both of these functions.

MR. LASTOVA: It could be one chip performing both functions, or it could be two separate chips that are working cooperatively.

JUDGE SAADAT: Okay.

MR. LASTOVA: All right. So I guess we've spent some time on sort of 101 issues. And I just want to get back to my main point, which is that I think that with the claims on appeal, if we look at 102 and we look at the features of the claims, we can see that they're directed to two different kinds of technologies in the sense that you have a Lee which says, "I'm going to provide all size DCTs, I'm going to let every DCT there, I've got an unlimited budget and I'm going to be able to provide all kinds of DCT type transforms, and I'm going to figure out which is the optimal one based on the block size"; and we've got our invention here which says, "Well, we don't

have that much liberty and we don't have that big of a bank account, so we want to be able to just use one DCT to be able to provide not only that size DCT operation, but we can also then generate a larger size DCT calculation as well and come up with those coefficients as well to provide, effectively implement, a larger size 'N', if you will, DCT operation using an 'N'-over-2-size DCT."

So the anticipation rejection, I believe, is simply wrong, because it doesn't teach the features required by the claims. And the examiner also applies a Tzou reference, which I don't think remedies the deficiencies of Lee with respect to the main things that we've been talking about here today and that are outlined in the brief and the reply.

Do you have any other questions?

JUDGE SAADAT: I don't have any more.

JUDGE NAPPI: I don't have any more.

MR. LASTOVA: All right. Thank you for your attention today.

JUDGE BLANKENSHIP: Thank you.

(Whereupon, at 9:45 a.m., the hearing was concluded.)